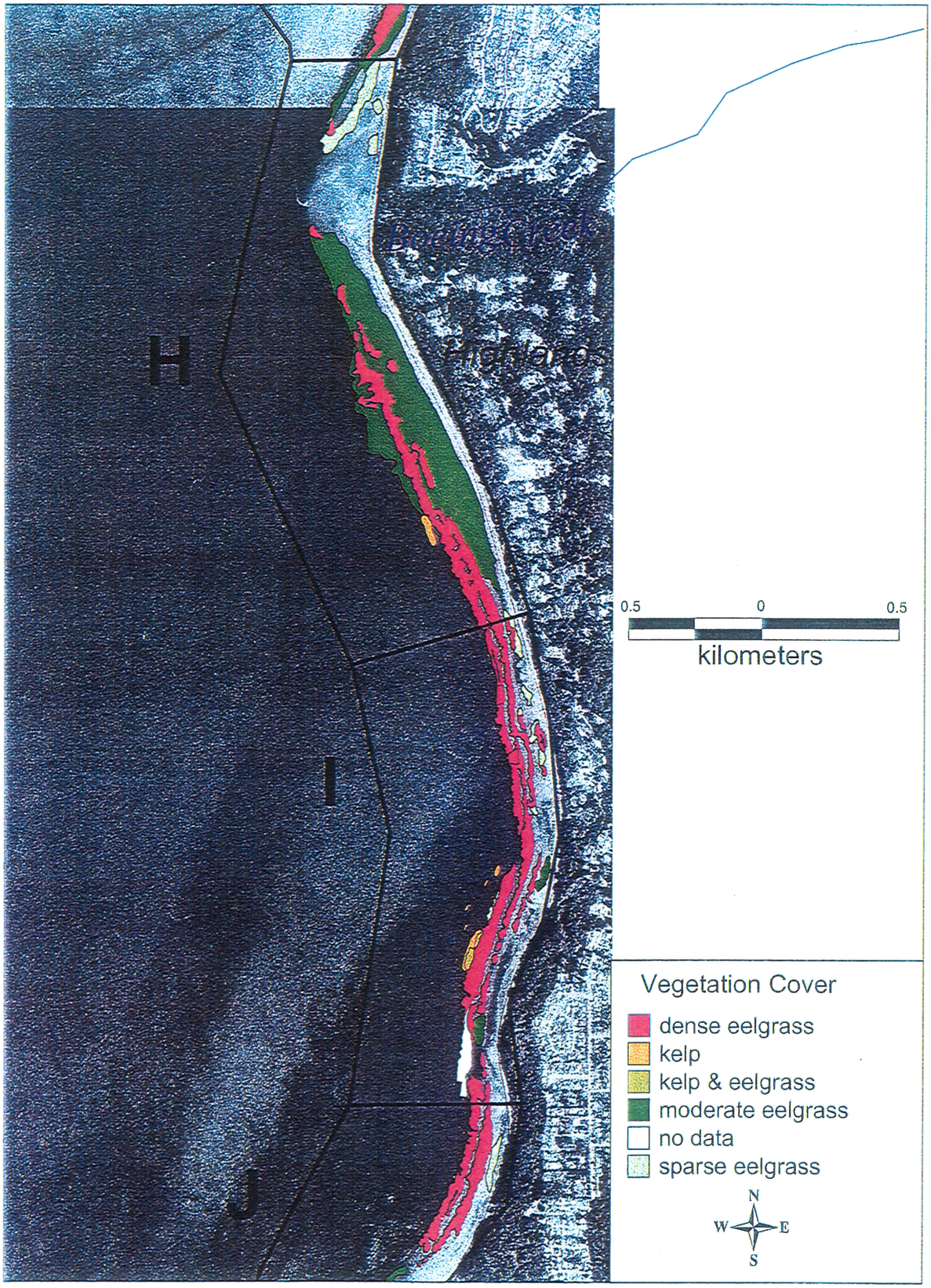

Figure 22. Vegetation cover at Areas H and I.

optimum density estimates, because the end of the growing season and storm events tend to remove or "thin" eelgrass meadows at later dates. Although this survey was conducted in October and the early part of November, maps were effectively and accurately developed to delineate eelgrass polygons and determine a density coverage type. The traditional WDF&W eelgrass surveys with divers use turion (shoot) counts to develop density estimates. Because eelgrass meadows are thinned somewhat during the off season, a traditional shoot count might not have been appropriate; however, the side scan sonar and underwater video provided density coverage and provided a more accurate delineation of the geographic locations and landscape architecture of the meadows.

A total of 29 hectares (2.6% of the study area) of kelp occurred in 7 of the 12 areas, and found in both sand and mixed coarse substrate. It was generally located on the outer fringes of eelgrass meadows, with the exception of an extensive bed in area D near the Edmonds Underwater Park, just north of the ferry terminal. Overall, kelp was found predominantly in mixed coarse substrate (20.8 hectares). The remaining 10.9 hectares of kelp were located in sand substrate, with 2.6 hectares of that associated with eelgrass.

The predominant substrate type was sand (1010 hectares) occurring in 90% of the study area. Mixed coarse substrate (91 hectares), which included gravel, shell hash, and cobble, generally occurred close to the shoreline, with several exceptions in areas A, B, and F where gravel beds were found in deeper water. There were occasional boulders found that were noted in the video and picked up as targets with side scan, however these areas were not large enough to be mapped as separate polygons. Extensive riprap existed along the shoreline but was outside our study area and not considered part of the mapping effort. Several large piers and docks were noted on the maps in Areas B and F, and

occasional wood debris, crab pots and other unidentifiable artificial substrate were recorded on the video and noted during postprocessing. Crab pots and other debris often had extensive populations of anemones and other invertebrates associated with it. Mixed coarse substrate occurred close to shore around creek mouths (Lunds Gulch, Deer Creek, Boeing Creek, and Pipers Creek). Generally, very little eelgrass was found in these areas. The absence of eelgrass usually extended into the surrounding sand substrate as well. This was more pronounced to the south of Lunds Gulch, and around Boeing and Pipers Creek.

Total macroalgae and *Ulva* were present to some extent in all areas. Its presence occurred to a greater extent in areas A through F than in areas G through L, and was frequently found close to shore or in shallow areas. *Ulva* frequently occurred in close association with eelgrass and, for this reason, was sometimes difficult to assign a density classification. Video transects were conducted between Oct 15, 1999, and Nov. 14, 1999, beginning at the north end of the study site and finishing at the south end. Since this occurred over a 1-month period at the end of the growing season and there were several storm events during this time, the spatial distribution and occurrence of macroalgae and *Ulva* might have changed or been reduced relative to what might have been observed earlier in the season.

Fish were categorized based on their schooling or non-schooling behavior. The schooling species occurring most frequently were tubesnout and shiner surfperch (Table 23). These species were present in all areas except shiner surfperch, which did not occur in areas I, J, and K. Flatfish (unidentified to species) were the most common non-schooling species, followed by ratfish. Tables 23 and 24 rank the occurrence of fish